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ABSTRACT

This paper presents an overview of government policies for funding higher education in 11 Organization for Economic Cooperation and Development (OECD) countries. In particular, it describes the mechanisms for funding the university sector and the extent to which the grants to universities are oriented on performance. The discussion focuses on whether universities are funded on the basis of what they produce in terms of graduates and research outputs and on the share of public funding provided through research councils. While in recent decades the attention paid to issues of efficiency, effectiveness, and quality has increased, there are only a few governments that explicitly link the universities' resources to the universities' results in the areas of teaching and research. This is illustrated by means of a graph. A number of tentative reasons for the popularity of enrollments-based funding approaches are presented in the final section of the paper. (Contains 1 diagram, 4 tables, and 44 references.) (Author/SLD)

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Ben Jongbloed

Centre for the Economics of Education and Training

Working Paper No. 35

March 2001

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Performance-based funding in higher education: an international survey

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Abstract

This paper presents overview of government policies for funding higher education in eleven OECD countries. In particular, it describes the mechanisms for funding the university sector and the extent to which the grants to universities are oriented on performance. Are universities funded on the basis of what they produce in terms of graduates and research outputs? And what is the share of public funding supplied through research councils? While in recent decades the attention paid to issues of efficiency, effectiveness and quality has increased, there are only few governments that explicitly link the universities' resources to the universities' results in the areas of teaching and research. This is illustrated by means of a graph. A number of tentative reasons for the popularity of enrolments-based funding approaches are presented in the final section of this paper.

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1. Introduction

This paper is about funding mechanisms for higher education. The central question is: do the funding authorities that decide on the universities' teaching and research grants base the size of the grant on measures of institutional performance? This question is triggered by the idea that the public interest in issues like value for money, quality and accountability will show up in the way public funds are provided to a nation's higher education institutions. One would expect that the funds supplied out of the public purse are dependent on institutional performance, because this would be in line with ideologies that stress a more market-like approach to management and budgeting throughout the whole of the public sector. This article, therefore, takes a look at the mechanisms used for funding universities in a number of OECD countries. We describe the situation at the end of the 1990s, and we try to establish whether the national governments employ *performance-based funding* (PBF) approaches. We will also try to give an indication of the nature and degree of performance-orientation in the funding mechanisms.

Our survey is restricted to *universities*; it does not regard other higher education providers, and we will look at how the publicly supported universities receive their core funding for teaching as well as research. Along the way, we will answer the following research questions:

1. Do public authorities (i.e. ministries and funding councils) use a *formula* when distributing the core funds (i.e. base operating grant) for teaching and research among universities?
2. What is the relative share of competitive *research council funding* in the budget of the university sector?
3. Do the higher education systems in a number of OECD countries differ in the extent to which the main national funding bodies incorporate information on institutional *performance* in their allocation decisions?

In addressing these questions this article provides an overview of the state-of-the-art with respect to performance orientation in university funding in eleven countries: Australia, Belgium (the Flanders community), Denmark, France, Germany, Japan, the Netherlands, New Zealand, Sweden, the United Kingdom, and the United States.

In section 2, we will make a few remarks on classifying funding models and PBF in particular. Section 3 goes on to address the above questions for the selected OECD countries. It describes in detail the funding of the two main functions of higher education institutions, i.e. education and research. In section 4, we make an attempt at comparing the eleven national funding mechanisms. The emphasis placed on performance in the various national allocation systems is illustrated by means of a diagram in which the position of a country reflects its degree of performance orientation vis-à-vis that of other countries. In section 4, apart from concluding remarks, we also make some speculations on the popularity of student-based (i.e. input-oriented) funding approaches.

2. Some remarks on funding mechanisms

For the allocation of the basic (or *core*) funds supplied by the government to higher education institutions, many approaches are in use. Sometimes governments use a negotiations-based approach, where a budget request drawn up by an institution is decided upon after negotiations between the budget authorities and the higher education institution. A part of the negotiations (or budget) sometimes is left to intermediary (or buffer) organisations, such as funding councils or research councils. In other countries we find formula-based mechanisms for the allocation of funds between the different institutions and different disciplinary areas. In many countries, budget authorities make use of a combination of formulas and negotiations.

Our central question is, to what extent the public subsidy allocated to a higher education institution is based on *input* elements (i.e. indicators that refer to the resources used and/or the activities carried out by the higher education institutions) or *output* elements (i.e. indicators that refer to the institution's performance in terms of teaching and research). In a 'production process approach' to higher education institutions – that is, if we distinguish between inputs, throughputs and outputs – performance-based funding (PBF) mechanisms are focusing on the output-side of universities and colleges. Funding then is tied to the 'products' of teaching and research activities of higher education institutions.

In a performance-oriented university funding mechanism, examples of output indicators incorporated in the formula or the budget negotiations are: the number of credits accumulated by students, the number of degrees awarded, the number of research publications, or the patents and licenses issued. These are the outputs that universities are able to control – at least to a large extent. Other output indicators, that lie a bit further away from the sphere of control of universities, would be: the relative success of graduates on the labour market, the number of graduates working in jobs related to their training ('graduate placement'), or the success of universities in generating additional funding from contract activities (in the fields of teaching as well as research).[2] Although some may argue that the number of enrolled students be viewed as an indicator of teaching output, we would regard student numbers as an input variable – it is the 'raw material' which is transformed into 'products'.

The choice of output indicators in PBF approaches often will be a controversial issue. If we agree on the idea that the ultimate mission of a university is to generate value added in terms of *human capital*, the correct way of measuring *education* performance would be some indication of the increase in knowledge and skills incorporated in students. It will be clear that such an ideal measure does not exist (Dill, 1997). What's more, for teaching, part of the increase in human capital cannot even be attributed to the university's efforts alone, but has to be attributed to the innate abilities and efforts of the students themselves (Barr, 1998). In looking for adequate *research* output indicators, one encounters similar problems. For instance, a straightforward indicator such as the number of research publications cannot express the impact, originality or even magnitude of the research performance of a university researcher or a research group. This is even more problematic if one tries to measure research outputs on different disciplinary areas.

Every output indicator therefore will have its shortcomings. The main reason for this is that the services of a university are not sold on a kind of market where supply is meeting demand and prices reflect costs, quality and scarcity. In fact, the market on which universities operate is very much an imperfect market. Therefore, instead of a single, one-dimensional measure, a number of different indicators will be used for approximating the many dimensions of the output in terms of quantity as well as quality. However, in practical situations, and to prevent 'injustices' being done to higher education institutions (HEIs), the funding agencies often will use a number of *input* indicators next to output indicators when deciding on the budgets to be allocated.

In any case, the mix of input and output elements in the funding mechanism will be a *political* decision, as the indicators will directly relate to the objectives of the funding authorities and how they feel these objectives can be met in the best way. Objectives often are volatile and depend on political agendas. They may range from the goal of universities becoming more output-oriented or academic research becoming more application-oriented, promoting cost-effectiveness and efficiency, et cetera. The range and priorities attached to the objectives will determine the choice and weighting of output and input indicators.

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[2] Contract income will strongly depend on a university's reputation and past achievements in specific areas. However, it also depends on the economic climate in a country (or region) and indirectly on major trends in world industry (eg. firms investing in, or cutting back on, research and development expenditures).

While the supposed advantages of PBF revolve around promotion of accountability and performance, the use of performance indicators for funding purposes can also have undesired side effects. It may lead to risk-avoiding behaviour among institutional administrators and academic personnel. That is, only the outputs that are easily attainable are produced. Second, PBF may lead to *satisficing behaviour*, meaning that academics will not be induced to operate in a way that would be optimal. If, for instance, the research *volume* is stressed by the funding formula, academics may be tempted to turn out large numbers of mediocre journal publications instead of releasing fewer, more original ones. As such, universities will under-invest in academic advancement in the long run. On the same note, if universities are funded on the basis of the number of degrees they award, some institutions may be tempted to lower the standards in order to improve their funding. So, again, quality is at risk and quality assurance mechanisms may have to be in place next to the funding mechanisms.

With regard to performance-based funding, Burke and Serban (1998) make a distinction between *Performance Based Funding* (PBF) and *Performance Based Budgeting* (PB2). They define PBF as "special state funding tied directly to the achievements of public colleges and universities on specific performance indicators". In PBF, the relationship between funding and performance is automatic and formulaic. The funding authorities (ministries, or intermediary bodies such as funding councils and research councils) explicitly include quantified teaching and research output data in the *formulas* they use for distributing public funds among institutions. Burke and Serban describe Performance-based budgeting (PB2) as: "state governments or co-ordinating boards are using reports of institutional achievements on performance indicators in an indirect way". In PB2, performance information (i.e. a quite long list of performance indicators) is used in a loose and indirect way for shaping the total budgets for public colleges or universities. Whereas the link between performance and funding is clear in PBF, it is much less clear in PB2, because it is discretionary and undeclared. Unlike for PBF, no formulas are used in PB2 approaches.

Though the use of *funding formulas* often is the first step in developing a system of PBF, their use is critically debated in literature (McKeown, 1996). The major advantage of funding formulas is that, because they use objective criteria, they provide a clear insight in the distribution of funds among higher education institutions. Therefore, they facilitate comparisons between institutions, thus reducing the lobbying by institutions. However, sometimes held against funding formulas is the belief that they might lead to a common level of mediocrity. Each unit (university, college, department, etc.) is funded on the same quantitative grounds and no qualitative assessments are included. In addition, formulas may reduce the incentives to seek outside funding and perpetuate funding inequities, because the units tend to become fixated on the parameters driving the formula. Formulas may prove inadequate in situations where changing needs and client bases are to be tackled, they may be inadequate for dealing with differentiation among institutions. To come close to a 'best of both worlds' situation, one would expect that in practice many funding authorities use funding formulas for part of the funding decisions, whereas they use non-formulaic approaches for other parts. Performance information can be included in both.

One of the main cases in which budgets are not determined on the basis of formulas but on qualitative assessments can be found in the approaches used by *research councils* for allocating budgets to researchers or research groups. Research councils, being intermediary agencies between universities and government, supply monetary support for research projects. The funds generally are awarded on the basis of project proposals submitted by researchers or research groups. In a competitive process knowledgeable experts (*peers*) judge the submitted proposals. The quality of the proposal and the requested budget are important elements in this process. Often, the expertise of the researchers and their past performance are used in the selection process. While the budget requests often will be based on a set of rules that prescribe how specific budget items (eg, staff costs) should

be calculated, the decisive factor in determining the budget in the end is qualitative judgement. Again, performance, or rather expected performance, is an important criterion in arriving at the funding decision. Therefore, below, we will use the relative share of research council funding as an important indicator of the degree of performance orientation in the (research) funding of the universities in the countries under study.

3. Addressing the research questions[3]

We will, first of all, look at the *share of research council funding*. The reason, explained above, is that research councils fund specific projects and pay a great deal of attention to the research outputs that result from these projects. Second, we look at the mechanisms that determine the core funds supplied by the funding authorities to the universities. We will especially be interested in the extent of performance orientation in the funding mechanisms. All of this is described for eleven OECD countries. The information collected on both issues will be used in section 4 to give an indication of the extent to which performance is taken into account in the public financing of universities.

The share of research council funding

To learn about the part of the universities' grants that is determined on the basis of academic achievements we will focus first on the public funds for basic research that are provided through intermediary bodies such as research councils. This is because research councils allocate funds to researchers (or teams of researchers), not just on the basis of the contents of the project proposals submitted for funding, but also on the basis of the demonstrated quality and capacity of the applicants. The relative amount of research council funding therefore is an indication of the extent to which funding authorities pay attention to the quality and output of academic research. Table 1 provides an overview of the relative share of university revenues derived from research councils.

Table 1: University revenues obtained from research councils, 1998-1999

Country	research council income (as a % of all public revenues)
Australia	8%
Belgium (Flanders)	17%
Denmark	20%
France	15%-20% *
Germany	10%
Japan	21%
Netherlands	7%
New Zealand	9%
Sweden	13%
United Kingdom	9%
United States	around 30% **

Source: Own calculations, based on respective countries' official documents.

Notes: Figures mostly relate to the year 1999 (the US figure is for 1996-97).

* The French percentage is a rough estimate, because total universities' income (including compensation for personnel) is difficult to determine.

** The US percentage is an estimate based on the share of 'Restricted federal grants and contracts' revenue for Research universities (I and II) and Doctoral universities (thus excluding Community Colleges and other degree-granting post-secondary education institutions).

One of the conclusions that can be drawn from the table is that two groups of countries can be distinguished. One group contains countries where research council funds represent only a relatively small amount of university revenues (Australia, the Netherlands, New Zealand, the UK, and - to a lesser extent - Germany). The other group includes countries in which research councils account for

[3] References for each of the funding system descriptions are given per country at the end of this paper.

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more than 10 percent of the universities' revenues from public sources. The US is exceptional in the sense that the public universities receive most of their research funds on the basis of contracts with federal agencies and a relatively small part from their state governments. The largest share of federal research supports originates from the *National Science Foundation* (NSF) and the *National Institutes of Health* (NIH). This is somewhat similar to the French case, where research units within universities receive research funds on the basis of contracts with national research organisations like the *Centre National de la Recherce Scientifique* (CNRS) and the *Institut National de la Sante et de la Recherche Medicale* (INSERM).

In addition to funding *projects* on a temporary basis, the research councils in Belgium and France largely finance top research *institutes* attached to universities. This points to fact that our national figures are difficult to compare, because part of the difference between countries results from differences in national research infrastructures. In some countries - such as Belgium, France and Japan - the major research institutes are integrated in the university system, whereas in others - such as Germany, the Netherlands and the UK - similar institutes operate independently from the university sector.

Funding formulas and funding mechanisms in 11 countries

We will now address the question, whether the funding authorities actually make use of a *funding formula* for determining the funds allocated for teaching and research (if they make a distinction at all between both basic activities). After that, we will give an outline of the funding mechanism for each country. When describing the funding mechanisms[4] for the university sector, it is a fact that in some countries separate mechanisms or formulas are in place for the funding of teaching and the funding of research. Whether these mechanisms actually lead to separate, designated budgets - that is, budgets only to be used for teaching, respectively research - is another question altogether. However, the funding authorities in all countries (except Germany[5]) in our sample will allow the institutions the freedom to use the combined core budgets for teaching and research in any way they see fit. This is known as *lump sum* funding. In many cases, the universities' base operating grant for teaching is supposed to be used for research as well, certainly for the research and scholarship which underpins teaching.

In four of the 11 countries surveyed - viz. Belgium, Germany, Japan, and New Zealand - the base operating fund flowing from the funding mechanism is meant explicitly for teaching as well as research. In Belgium, the operating budget allocated to a university consists of a component for teaching and for teaching-related research. In Germany, total basic funds (*Grundmittel*) for teaching and research combined are allocated as a budget that is mainly based on last year's budget, allowing for price changes and policy-based adjustments. In Japan, integrated budgets are allocated on the basis of student numbers, the number of staff and academic units. And in New Zealand, a key reason for the fact that some research funds are included in the student-based operating grants for teaching *and* research is that people who teach in degree programs should be involved in research. The latter is also the case for Australia. The funding of research in US universities takes place primarily through federal research councils and foundations. On the state level, however, some legislatures include an allowance for research in the funding rate per student that underlies the universities' teaching grants.

However, the extent to which teaching and research are interwoven is not so explicit in the other countries, where the core funds for teaching and research follow from separate funding formulas. In

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[4] Excluding research council funds and special budgets for investments or facilities for students.

[5] In Germany, the states (the *Bundesländer*) will generally have some restrictions on the expenditure categories (eg, specific categories of personnel versus material and capital goods) where public resources may be spent on.

Denmark, for instance, teaching and research funds are allocated through two different ministries. In France, the core funds for research and teaching are supplied through two separate streams, with public institutions negotiating and signing two separate *contracts* with the Ministry of Education: one for the whole institution (stressing teaching) and one for research. In the UK, Sweden, and the Netherlands, the core funds for teaching and the core funds for research are based on separate formulas. We will now look more closely at the formulas and mechanisms that are in use in the countries under study.

The use of funding formulas is widespread among the countries, in particular where the funding of teaching is concerned (see table 2).

Table 2: The use of funding formulas for determining the university's core funds

Country	Do formulas underlie the teaching budget?	Do formulas underlie the research budget?
Australia	Yes	Partly
Belgium (Flanders)	Yes	Yes
Denmark	Yes	No
France	Yes	No
Germany	No	No
Japan	Yes	Yes
Netherlands	Yes	Partly
New Zealand	Yes	Yes
Sweden	Yes	No
United Kingdom	Yes	Yes
United States	Yes	No

Of the countries surveyed here, Germany is the only one where no funding formulas are used for determining the university budgets. However, there is reason to believe that current trends towards more decentralisation and lump sum budgeting will encourage their development and use in many of the German *Länder*.

As far as research is concerned, we see more variety in the use of formulas. We listed a 'No' in table 2 if the core funds for research are allocated through a mechanism that makes funds depend to a large extent on previous years' funding. One may refer to this as *incremental* funding. This is the case for Denmark, Germany and Sweden. For France and the US, we also listed a *No*, because most of the core funding for research is allocated on the basis of *contracts* signed between universities and the funding authorities (ministries, respectively research organisations/councils) responsible for research.

In other countries, at least a part of the operating grants for research is allocated on the basis of a formula. In the Netherlands, almost 13% of the universities' research funds is related to the relative number of PhD degrees awarded. However, the major part (some 80% of the research budget), so far has been a component that has remained largely unaltered and that has its roots in history. In Australia, a formula known as the *Research Quantum* is in place for calculating a small part of the universities' allocation for research on the basis of a weighting of input and output indicators.[6] In 2001, a new formula-based scheme was introduced to distribute funds for the research training of postgraduate students. The scheme takes into account input as well as output indicators.

Belgium, New Zealand and the UK are examples of countries where the core funds for research are mainly distributed on the basis of a formula. In Belgium and New Zealand, the amounts are driven by student numbers (the funding of teaching and research is an integrated affair). The UK is the

[6] From 2002, a modified formula (known as the Institutional Grants Scheme) will be used, based on similar indicators but distributing a larger amount of funds.

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only country in our sample where the allocations for research are fully determined on the basis of a funding formula that takes into account the quality and the volume of research, but does not consider either historical allocations or student load. Overlooking the eleven countries we conclude that the funding of teaching and research is a mix of formulas, history and negotiation. For the teaching part, often the emphasis will lie on formulas, while for the research part most countries will have multiple funding approaches.

The degree of performance orientation in university funding

The central issue of this paper concerns the question to what extent the funding authorities in the eleven countries have oriented their funding towards the institutions' performance in teaching and/or research. As far as research is concerned, we will observe both core funds (supplied directly) and research council funds (see above). A relatively high share of research council funding indicates a strong performance orientation. This would be the case for countries like the US, Japan, France, Denmark, and Belgium. This performance-orientation may be even stronger if the universities' core funds from the public purse are determined on the basis of output indicators. For this, we will have to look at the funding mechanisms in place for distributing public funds for teaching and research to universities.[7]

In table 3, we provide an overview of the use made of performance information in the funding mechanisms that underlie the core budgets for teaching and research (excluding research council funds). The performance information can take several forms. There is a choice of output indicators that are currently in use in the countries included in our survey, such as:

- number of credits accumulated by students
- number of graduates (i.e. degrees awarded)
- research publications (number and/or quality thereof)
- number of doctoral theses

Even more important is the issue of the *proportion* of the budget that is determined by direct reference to performance indicators. However, this proportion and, therefore, any quantitative measure of the degree of performance orientation, are difficult to determine. So, for comparing the different countries' funding mechanisms, one will have to resort to a qualitative judgement. Table 3 gives the outcome of our assessment of the funding models for teaching and research. An explanation of the scores is given below.

Table 3: Performance orientation in the funding mechanisms for universities

Country	Degree of performance orientation in the allocation of core funds for:	
	Teaching	Research
Australia	-	-/+
Belgium (Flanders)	-	-
Denmark	+	-/+
France	-	-/+
Germany	- to -/+	-
Japan	-	-/+
Netherlands	+/-	-/+
New Zealand	-	-
Sweden	+/-	-
United Kingdom	-	+
United States	- to -/+	- to -/+

Legend: + : fully output-oriented
+/- : mix of output- and input-orientation, but primarily output-oriented
-/+ : mix of output- and input-orientation, but primarily input-oriented
- : fully input-oriented

[7] We acknowledge that the relative share of revenues generated from non-public sources also tells something about the relative performance orientation of higher education. However, this is not included in our analysis.

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One of the main conclusions to be drawn from this table is that, with a few exceptions, one cannot speak of a high degree of performance orientation in the countries surveyed here. This is a fact for teaching as well as research. This may come as a bit of a surprise considering the attention paid to accountability and quality issues in public debates on university funding. With respect to the core budgets for teaching, Denmark seems to be the only country that employs an example of output-oriented funding in our sample. As regards the funding for research, the UK shows the strongest performance orientation. However, one should also include the relative importance of research councils (see table 1) before drawing any firm conclusions on performance-orientation in research funding. Below, we will take a closer look at the mechanisms in place and explain the respective country scores in table 3.

Australia

In Australia, the base funding for teaching to undergraduates mainly depends on the number of student places negotiated between the individual institutions and the department for education in the so-called "profiles negotiations". Changes in the number of funded places have been relatively small over the years. As far as research is concerned, only a limited part of the universities' public funds is dependent on institutional performance. Through a formula known as the Composite Index, some 4.5% of the universities' operating and related grants – the *Research Quantum* – is allocated on the basis of research performance. The index is based on the relative success of universities in obtaining competitive research grants and other research income from public and private (i.e. industry) sources, as well as on the number of research publications and the number of higher (i.e. PhD and Masters) degrees awarded. The weights attached to the research income (i.e. input) indicators and the combined publications and completions (i.e. output) indicators are 0.8 and 0.2 respectively. From 2002, the Research Quantum will be replaced by an *Institutional Grants Scheme*, that will distribute funds on the basis of a modified formula that takes into account research income (60%), research student load (30%) and publications (10%). Recently, the Australian government introduced the *Research Training Scheme* that distributes 10% of the operational and related grants on the basis of a similar formula with slightly different weights.

Belgium

In the Flanders Community of Belgium, the core funds for teaching and teaching-related research are enrolment-based, since student numbers (split into three different categories) and previous years' allocations produce the universities' core budgets. The universities receive most of their research income through projects funded by federal research federations and action programmes (IWT, NFWO, IOW and IUAP) after a process of competition and peer review.

Denmark

Denmark is the only country where teaching budgets are determined solely on the basis of output. This funding mechanism is known as the *taximeter* model. Funding is based on the number of credits obtained by students during each year. The tariff per credit paid out to the institution varies according to the field of study. The basic research grant has a historical underpinning. By far the largest part of the grant is allocated according to the previous year's amount. Changes are incremental. Only a small part of the grant is related to the university's income from teaching activities (that is the number of credits accumulated) and the institution's income from external funds (i.e. grants from the Research councils, the Research Foundation, the European Union, and so forth). Over the past few years, the national authorities have also put forward proposals to use qualitative criteria in allocating the basic research budgets to institutions. In recent years, the introduction of *performance contracts* – with the Research Ministry and the individual institutions negotiating on the mission, goals, management and autonomy of the institutions – was debated. However, the new system still is not clear and far from the implementation stage.

France

The French system of supplying teaching funds to universities is based on the number of enrolled students. All programs are categorised in a grid that serves as a weighting device to determine the standard costs per student. The level and type of the program determine the weight, taking into account issues like required floorspace and support staff for each program (presently, there are 18 cost categories). This is known as the SANREMO (*Système Analathique de Réparation des Moyens*) model. The formula does not include any fixed costs, but is adjusted in line with the scale of the institution (as measured by the number of students). However, one should realise that staffing issues are primarily belonging to the authority of the central government. The Ministry of Education is the employer of nearly all staff. It allocates posts to the institutions, recruits staff to fill these posts, and determines salaries. So, educational staff is funded separately. Furthermore, institutions may receive some additional funds for specific projects, which are specified in additional contracts. Research is funded in a 'dual' way. On the one hand, universities receive personnel and grants from the Ministry. This is laid down in contracts, and allocations are partly based on research evaluations, implying some degree of performance orientation. On the other hand, the research units of the universities receive resources on the basis of (mostly four-year) contracts with the major national research organisations, the *Centre National de la Recherche Scientifique* (CNRS) and the *Institut National de la Santé et de la Recherche Médicale* (INSERM). The first stream of research funds mainly concerns the funding of doctorate programmes, research schools, and the research institutes recognised by the CNRS and INSERM. Of the resources for research teams and laboratories, universities may only spend 15% for carrying out their own research programme. However, research staff is centrally appointed, paid, and allocated across the universities' units. A striking feature of French higher education is the contractual policy. Contractual agreements, based on four-year development plans, are signed with national authorities. The contract is not a legal contract, but has to be regarded as a set of mutual, explicit and formalised engagements covering all aspects of the university.

Germany

In the case of Germany, the integrated core funds for teaching and research are negotiated between the state legislatures (the governments of the *Länder*) and the university sector. In the majority of cases, the resulting budgets are based on historical considerations and not so much on factors such as enrolments or performance. An important aspect of German higher education is the fact that university staff is formally appointed and paid for by the state government. Staff salaries therefore do not show up in the institutions' financial accounts and institutions only have limited freedom to reallocate staff across the different departments in the university. Lump sum funding (*Globalhaushalt*) is heavily debated in Germany, but so far only little progress has been made. Some states, however, do experiment with funding formulas and some even allocate a small part of the (non-personnel) resources on the basis of output indicators like the number of graduates, the number of doctorates and the volume of research grants from the research foundations. The most important research council in this respect is the *Deutsche Forschungsgemeinschaft* (DFG). Some private research foundations, like the *Stiftung Volkswagenwerk*, or the *Stifterverband für die Deutsche Wissenschaft*, are also regarded as prestigious bodies. However, these only supply moderate amounts of research money.

Japan

The public universities in Japan receive their funds for teaching activities mainly on the basis of the number of student places, teachers and the number of educational units. As far as research is concerned, again an input-based formula is applied which takes into consideration staff posts, type of research, and number of graduate students. Part of the core funds are allocated for quality improvement and setting up *Centres of Excellence*. Research funding, however, in particular is dependent on money distributed by the so-called *Science Council*. This council acts like a research council, although it is less independent from the government than research councils in other

countries. From table 1, it will be clear that the volume of competitive research money which is distributed by the Science Council is considerable.

The Netherlands

Ever since the early 1990s, the Dutch funding mechanism has made use of performance indicators in the funding formulas for teaching and research. Up to 1997, the number of Master's degrees[8] awarded was used for distributing some 20% of the teaching funds to universities, the remaining 80% was based on the enrolments in each university. However, only those students that had not been studying longer than the official, stipulated program length were taken into account. From the year 2000 on, a *Performance Based Funding Model* (PBM) is in use, which distributes 50% of the core teaching funds on the basis of the number of Masters degrees, 13% on the basis of new entrants, and the remainder as a fixed (historically-based) allocation. For funding reasons, students and diplomas are grouped into two cost categories (roughly: social sciences, arts and humanities versus the rest of the disciplines). As part of their research budget, Dutch universities receive a premium for each postgraduate degree (PhD, designer certificates in engineering) awarded. However, the bulk of research funding (the so-called *strategic research component*) is based on historical reasons, in spite of the government's original plans and more recent attempts to have this part based on research assessments and societal value added criteria. From the early 1990s onwards, the establishment of so-called Research Schools, consisting of researchers and PhD students from different universities but working in the same field, has been used as an instrument for the integration, concentration and proliferation of research. Research allocations to accredited research schools and a small number of high-quality research schools have recently led to a small reduction of the amount distributed on historical grounds.

New Zealand

In New Zealand, the government's core funding for teaching and accompanying research in universities takes the form of tuition subsidies that are paid out to higher education providers on the basis of the number of equivalent full-time students (EFTS). In the funding formula used, 1.0 EFTS is defined as the student workload that would normally be carried out by a full-time student in a single academic year. Funding rates are differentiated by subject content and qualification type (eg, non-degree, degree, etc). There is no separate funding formula, or indeed allocation, for research as far as the core funding of universities is concerned. The remainder of research funds from government sources comes from the research councils, that provide project funds out of three separate contestable pools: the *Public Good Science Fund* (PGSF)[9], the *Marsden Fund*, and the *Health Research Council*.

Sweden

The Swedish funding formula includes input and output indicators for calculating the universities' allocations for teaching. The Ministry of Education and each individual institution agree a contract that covers education and research. This resembles the French system to some extent. Institutions of higher education receive an *educational assignment* for each new three-year period. The allocation of resources depends on results measured in terms of students (calculated in terms of full time equivalent students) and study achievements (calculated in terms of annual performance equivalents) at the institutions. The weightings are, respectively, 40% (for student numbers) and 60% (for accumulated credits). The funding rates differ for broadly defined subject areas. In the educational assignments, minimum numbers for certain degrees taken at the institutions in question are stipulated. Objectives with respect to the minimum number of students as a whole and for the lowest number of students in science and technology areas are set out for each fiscal year. The assignment

[8] Officially, Dutch universities do not issue Bachelor degrees. However, in a few years time these will be introduced in all Dutch higher education institutions, according to the Bologna declaration which was signed by all Western European countries.

[9] The PGRF has recently been abolished and replaced by the New Economy Research Fund.

may also stipulate that the number of students must increase or decrease in certain subject areas compared with the preceding three-year period. There is a ceiling, which constitutes the maximum compensation for FTE students and annual performance equivalents permitted for the fiscal year.
Research and postgraduate training is funded by way of special grants to the universities in question. Up to 1998, the respective institutions' allocations were mainly adjusted incrementally from year to year. However, as of 1999, resources are no longer allocated by faculty but will be distributed to four areas of research. The research activities are – again – covered in a contract, which, for instance, specifies that a minimum percentage of the grant is to be used to fund postgraduate training. The remaining portion of the research grants comprises project funding provided by research councils and sectoral agencies, together with local authorities and county councils.

United Kingdom
for their teaching activities the UK universities were, until recently, primarily rewarded by the *Higher Education Funding Councils* on the basis of their relative efficiency in instruction. However, this has recently been changed into a system of *equitable funding*, meaning that similar activities are funded at similar rates for all institutions. Projected numbers of full-time students is the basic variable that determines the teaching grant. The student numbers are adjusted for subject-related factors (there are four broad groups of subjects), student-related factors (eg, different forms of enrolment), and institution-related factors (eg, institutional scale, location, age of buildings). Total weighted (fte) student numbers are multiplied by a base price, which leads to the university's standard resource. If the difference between the standard resource and the institution's actual resource (ie, the previous year's resource adjusted for various factors such as inflation) is no more than 5 per cent, then the funding council will carry forward the grant from one year to the next. For institutions outside of this tolerance band, the funding council will adjust their grant and/or student numbers so that they move to within the tolerance band over an agreed period. Some variation around the standard resource therefore is allowed in order to recognise the differing circumstances and historical funding patterns of different institutions. The resulting budget forms part of a funding agreement drawn up each year between an institution and the funding council. This contract is constructed in broad terms and states the weighted student load which is being funded as well as the maximum student numbers that the institution is permitted to recruit before a financial penalty is imposed.
Public research funds are provided under a dual support system, with funds coming from the funding councils as well as the research councils. The research funds allocated by the funding councils are intended to provide the underlying infrastructure upon which funds provided by the research councils can rest. The funding councils represent the biggest source of research funds. Their research funds are distributed largely on the basis of the quality ratings of the universities' departments across some 70 academic disciplines and by a measure of the volume of research. The quality of research is assessed in a *Research Assessment Exercise* (RAE) conducted every four or five years. In the RAE, each academic unit that subjects itself to an assessment by a team of peers is awarded a rating, on a seven-point scale, for the quality of research in each unit of assessment in which it was active.[10] Low ratings (1 and 2) attract no funding, while the top 5* rating (five star) attracts approximately four times as much funding as the second to lowest rating (of 3b) for the same volume of research activity. The number of research active academic staff in the individual departments is the most important measure of the volume of research activity. It accounts for almost two-thirds of the total. Other volume indicators are research income from private research foundations ('charities') and the number of research assistants and postgraduate research students. The RAE score is translated into budgetary allocations within three broad groups of subjects in order to reflect the relative costs of research in different subjects. Universities are not expected to

[10] There is also a Teaching Quality Assessment (TQA). However, instead of determining funding, the TQA outcomes are intended rather to *inform* funding.

model their internal allocations on the model of the funding council. They are free to allocate their block grants according to their own priorities within broad guidelines.

United States

In the United States (US), accountability has always been high on the political agenda. Therefore, one would expect to come across many examples of PBF-approaches in the different states. Indeed, in a study carried out in 1996 by the *State Higher Education Executive Officers* (SHEEO), it was concluded that: 'performance-based budgeting is the most significant trend in state budgeting'. In a more recent study by the SHEEO (Burke and Serban, 1998) it was shown that PBF- and PB2-approaches are gaining in popularity in the different states of the US (see table 4). In 1998, of the 50 states covered, half use a type of either PBF or PB2, or a combination of the two. However, with the exception of Tennessee, where from 1981 on PBF has been in use (see Banta *et al.*, 1996), the other states (such as Florida, Missouri, Minnesota) only have experimented with PBF or PB2 for at most five years. Earlier, we already noted that the US research funding method is the most obvious example of a highly competitive and performance-oriented system. Federal agencies like the NSF, the National Institutes of Health, and the Department of Defence award the bulk of fundamental research funds for American universities and colleges. In fact, unlike their European counterparts, the American universities do not receive substantial amounts of funds as core funding for basic research from their legislatures. However, some states incorporate an allowance for research in the funding rates applied to student numbers in the enrolment-based formulas that are frequently underlying the basic grants to the universities. The universities in the US therefore will have to compete for the bulk of their research funding, whereas many European universities often receive historically based allocations for research from their governments or funding councils. While there are many states that use PBF- or PB2-approaches, the amount of funds that is tied (directly or indirectly) to results is relatively small, and usually does not exceed the mark of 5 per cent of the institutional allowance. South Carolina is the only state where the legislature has expressed the intention to allocate 100% of state higher education funding on the basis of institutional performance on 37 (!) specific indicators. In the year 2000, 35% of state funding in South Carolina is based on a large number of performance indicators in 9 categories. Most US states, however, adopt performance measures primarily for accountability purposes or informing students about higher education; they do not (yet) use them for funding decisions.

Table 4: Performance-based budgeting and Performance-based funding in the US

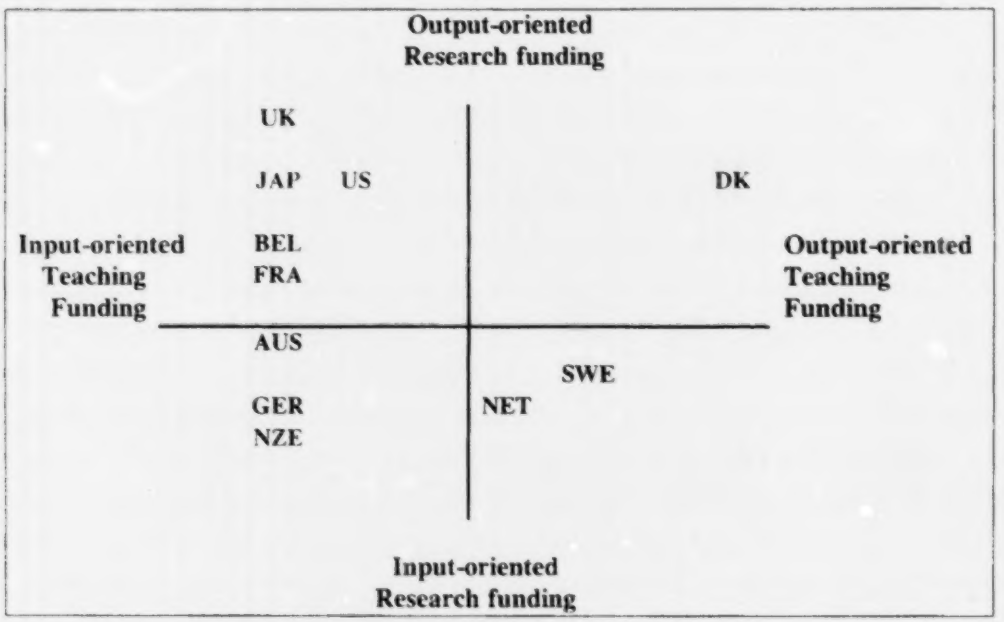
	Performance-based budgeting	
year	*Number of states (% of all states)*	*States*
1997	16 states (32%)	Colorado, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Mississippi, Nebraska, North Carolina, Oklahoma, Rhode Island, Texas, West Virginia
1998	21 states (42%)	All states mentioned in 1997, plus: Louisiana, Maine, Oregon, South Dakota, Washington
	Performance-based funding	
1997	10 states (20%)	Colorado, Connecticut, Florida, Kentucky, Minnesota, Missouri, Ohio, South Carolina, Tennessee, Washington
1998	13 states (26%)	Colorado, Connecticut, Florida, Illinois, Indiana, Louisiana, Missouri, Ohio, Oklahoma, South Carolina, South Dakota, Tennessee, Washington

Source: Burke & Serban (1998)

4. Summary and discussion

In Diagram 1, we present our conclusions with respect to the degree of output orientation in university funding. We give a tentative indication of the relative positions of the eleven countries with regard to their performance orientation in the funding of teaching (the horizontal axis) and the funding of research (vertical axis). Along the vertical axis we integrate the relative importance of research council funding (see table 1) and the role of outputs in the supply of the core research funds (see table 3, right-hand column).

Diagram 1: The relative performance orientation in the university funding mechanisms



All in all, it can be concluded that most of the countries show more output orientation as regards research than for teaching. This is due in particular to the share of research council funding that varies between 7% and 30% of the universities' grants. The UK is exceptional in the sense that all core funding for research is highly selective and quality-oriented. The funding of teaching is performance-based in three countries only. In Denmark and, to a lesser extent, the Netherlands and Sweden, universities are funded on the basis of awarded degrees or accumulated credits.

The role for output indicators in the funding mechanisms still is relatively small for the 11 countries, despite the increased attention for issues of accountability and value for (public) money. It seems to be the case that many governments prefer to apply a somewhat *soft* approach to performance enhancement, relying on other mechanisms instead. In many cases this approach is characterised by having universities generate an increasing amount of data on different aspects of their activities. This information will allow the university's various stakeholders to form their opinion on the university's performance and, for instance, allows (prospective) students to make better-informed choices.

In the United States, for instance, the use of performance indicators (PIs) is mainly for accountability reasons. However, in an increasing number of states, funding decisions are informed

by PIs, and incentive funds are set aside in the higher education budget to promote the achievement of specific targets. These incentive funds, however, are relatively small.

The French, Danish and Swedish case, however, also teach us that instead of a one-sided, formulaic approach that directly ties resources to results, the funding authorities may strive to engage the universities in a kind of 'social contract'. This contract policy may be worthwhile if differences between institutions are relatively large. The contracts allow some freedom to manoeuvre and engage the contract partners in a discussion. In short, contracts may be worthwhile if there is a need to build understanding and trust between funding authorities and higher education providers.

For the funding of teaching, we conclude from section 3 that enrolment-based formulas are still widely used. Why are governments so reluctant in linking resources to results in this area? The reasons may lie in the belief that, if performance is to be understood in terms of increasing diversity and responsiveness in the system to the needs of students, enrolment-based formulas may be worthwhile. If an individual university's grant depends on the number of students that have chosen to enrol for its courses, it is actually the students *voting with their feet* that determine the university's resources. In other words: 'money follows the student'. This will probably give the universities an incentive to look after their customers and the content and quality of the program offerings. The performance concept in a student-based funding system like this relies on the idea of quality as 'fitness for purpose', rather than quality as 'academic excellence'. A student-centered perception of quality in particular becomes relevant in times when consumer tastes are increasingly diverse.

Enrolments-based funding systems, however, can only function properly when a number of conditions are fulfilled.
First, there would have to be no restrictions on the amount of students the university is allowed to enrol. As soon as there are government-imposed limits on the number of funded student places (eg. Australia, UK, Denmark, Sweden) the intended effects of 'students voting with their feet' will be diminished.
Second, in order to be able to make well-informed choices, students will have to have easy access to reliable information on the programs and courses provided by higher education institutions. This consumer information can be made available by government agencies as well as private and non-profit agencies.
Third, national authorities and education providers should not be allowed to create unjustified obstacles that prevent the students from taking parts of their degree or programs in different universities. Barriers like this may be caused by the fact that universities fear losing part of their subsidy when students leave for other education providers. On the same note, universities may be tempted to frustrate the portability of credits and courses and the recognition of prior learning. Governments, on their part, will have to look critically at arrangements for funding and selection in the different sectors of the education sector that prevent a 'seamless course provision'.
Fourth, student support systems will need to be flexible so as to enable students to do parts of their education and training at different locations and points in time. Again, like the prevention of entrance barriers, this is supportive to the idea of *lifelong learning*.
Fifth, and finally, the students' private contributions to the cost of their training have to be sufficiently real for them to make a wise choice of program. Therefore, non-marginal tuition fees will have to be charged to students.

The funding of the universities' teaching activities does not need to be transformed into either a performance-based system or a vouchers-type system if work is done on fulfilling the above conditions. Governments may continue to rely on enrolment-based allocations instead of advocating PBF-approaches and feel it is wiser to make greater efforts in the areas of improving student choice

and assessing the quality of teaching and research. This observation would correspond to the low weights attached to performance indicators in the funding formulas used by many OECD countries.

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